verted into oleic acid and again subjected to the action of sulphuric acid. The author, unfortunately, says nothing definite about the vital matter of expense, but as far as the complete recovery of the by-product is concerned the process now leaves little to be desired.

The other matter of interest is the Twitchell method of decomposing fats into their constituent fatty acids and glycerin. This is effected by boiling the fat with water and a small quantity—about 1 per cent.—of sulphobenzenestearic acid. On standing, the products of the reaction separate into layers of fatty acids and glycerin of a relatively high degree of purity. Not only in candle-making, where it is now largely used, but in soap-making, the process is claimed to be economically superior in several respects to the time-honoured method of saponification with alkali hitherto universally adopted. It gives a greater yield of glycerin; the cost of recovering the glycerin is smaller owing to the much greater purity of the menstruum; there is economy in the cost of material, since soda-ash can be used instead of the more expensive caustic soda for converting the fatty acids into soap; and, finally, the necessary mechanical equipment is simpler. Whether or not with these advantages the Twitchell process will eventually supersede the historic alkali method of soap-making remains to be seen; the indications are that it may well do so. Meanwhile, the remarkable steatolytic action of the sulpho-aromatic fatty acids, on which the process depends, is worthy of note from the scientific point of view. One explanation of the ease with which fats are resolved into their constituents by these compounds assumes it to be due to the emulsifying power of the sulpho-acids, but the matter requires further investigation.

The most approved methods for the recovery of glycerin are fully described, and the work closes with a chapter on the chemical examination of raw materials and factory products.

In view of recent events in this country, it is interesting to read that in the United States, where other kinds of "trusts" seem to flourish, there is but little "cooperative control of production" in the soap industry. On the contrary, there is a marked tendency towards self-sufficient independence among the individual producers. The author's reason for this is that, whilst control of the raw material and of the facilities for transport are two essential factors in organising a successful "combine," these conditions are largely absent in the production and distribution of soap.

> "The chief raw material is obtainable wherever meat is eaten, and the market exists wherever cleanliness is appreciated."

Possibly more than anything else it was the difficulty of monopolising the supplies of raw material that recently enabled the individual producers in this country to maintain the "tendency towards self-sufficient independence" which the author notes in the case of soap-makers in the United States.

C. SIMMONDS.

SOME PROLEGOMENA TO THEOLOGY.

Völkerpsychologie: eine Untersuchung der Entwicklungsgesetze von Sprache, Mythus und Sitte. By Wilhelm Wundt. Zweiter Band. Mythus und Religion. Erster Teil. Pp. xi+617. (Leipzig: Wilhelm Engelmann, 1905.) Price 14s. net.

THIS is the first part of the second volume of Wundt's important work, and it deals in three long chapters with imagination, imagination in art, and imagination in the formation of myths.

The first chapter defines imagination, and points out its chief characteristics, *e.g.* that it is intuitive in its working, and does not deal with the products of the understanding, that it is creative, and that it is spontaneous or involuntary. The author claims that experimental analysis reveals its mode of operation as a subjective condition of all our perceptions in space and time. More especially the illusions in space-perceptions are discussed by which, *e.g.*, a tetrahedron as represented on paper may appear to face the spectator in two quite different ways, according to the position of the point fixated; and again, in regard to time, it is pointed out how the imagination of itself supplies the measure into which a succession of musical notes of precisely the same emphasis and length is fitted; so, too, with speech-rhythm. Sensations of light, colour, movement, and the like are next discussed, and the author reaches the conclusion that there are two main principles at work in imagination, the one *vivifying apperception*—the spectator so projecting himself into the object that he feels himself at one with it—and the other *the power of illusion or imagination to heighten feeling* The writer now passes to child-psychology, and analyses imagination in children as it may be observed in their play, their fairy tales, and their attempts at drawing; and in comparing the products of the artistic faculty in children and in savages he emphasises the two points that neither savages nor children, as a rule, copy objects before them, but recall what they have seen, and that both prefer objects in which they have an immediate interest, generally men and beasts.

The second chapter deals with imagination in art. Wundt believes that it is utterly idle to inquire what form of art arose first, that in the most primitive races we find the beginnings, not only of the musical arts (including both dance and song), but of the graphic arts as well. Into the details of the chapter, which discusses the whole range and development of the graphic and musical arts, we cannot now enter. The author inquires, among other things, why in early art beasts are drawn more truthfully than men, and notes that as early art is generally based on recollection it exhibits a face view of human beings, but a profile view of beasts. The discussion of *Stilisierung* on pp. 186–8 is interesting, and the gradual progress exhibited of the alligator-motive, though perhaps not convincing to the ordinary man, is as possible as many other things in anthropology.

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A suggestive treatment, too, may be found of the different effects produced by portrait and statue (p. 274), and of the reasons that may be given for the differing shapes of Egyptian and Greek temples. In dealing with song, the author contests the view of Preuss that all work-songs were originally charm-songs. He strongly opposes the theory of Jacob Grimm that the fairy-tale is a degenerate nature-myth; his own view with regard to the relative position of the fairy-tale, the nature-myth, and the epic appears to be that the epic has two sources, traditions of actual heroes on the one hand, and the despised fairy-tales on the other, and that it has not as its immediate preparation any such high-flown theogony and cosmogony as the supporters of the Grimm theory allege. He discusses, too, the views of Usener, the foremost representative of the nature-myth hypothesis, who regards Thersites, for example, as being originally a god, and who sees in the struggle between Thersites and Achilles a variation of the old story of the struggle between summer and winter.

The third and last chapter opens with a contrast between the historical and the psychological treatment of mythology, and the author claims that psychology is of more importance in dealing with myth than in dealing with speech, which after all is, in the narrower sense, a psychophysical function. His discussion of the various types of theory, the naturalistic, the animistic, the theory of analogy and the like, if full and adequate, is a little hard to follow. The author is strongly opposed to the hypothesis that myths have all arisen in one period and one country.

"If Anthropology has established anything," he writes, "it is this, that the qualities of human imagination and the feelings and emotions that influence the working of the imagination agree in their essential features in the men of all zones and countries, and that therefore no migration-hypothesis, going far beyond the bounds of possible proof, is needed to explain the similarity of certain fundamental ideas in mythology, while on the other hand the perpetual differences of these products of the imagination, depending as they do on natural surroundings, race and degree of civilisation, in many ways point directly to an autochthonous origin."

The cream of Wundt's own psychological theory on the matter seems contained in p. 579; mythological personification he regards as only a heightened form of what writers on æsthetics call *Einfühlung*, "a form in which the whole personality in its momentary condition of consciousness, together with the after effects of earlier experiences which enter into this, passes over to the object." So we have only to do with a modification of that general function without which the object could not exist for us at all, namely, apperception.

Space fails us to discuss the topics of the closing pages, the distinction drawn between myth and poetry, the mutual influence of myth and poetry, their relations to speech, and so on. The second part of this volume will be concerned with the problems that surround the connection between myth and religion. The full significance of Wundt's contribution to his present subject can hardly be realised until that part has appeared, and for this and many other reasons its speedy publication will be welcome to the numerous readers whom this instalment has doubtless interested and attracted.

COAL MINING.

The Principles and Practice of Coal Mining. By James Tonge. Pp. viii+363. Illustrated. (London: Macmillan and Co., Ltd., 1906.) Price 5*s.* net.

UNTIL the year 1866, when Sir Warington Smyth wrote, for Weale's excellent series of rudimentary handbooks, his little book on coal-mining, the art of mining was in the trammels of empiricism; but since that date progress has been rapid. Indeed, the tendency of the times is now towards a higher standard in mining as in all branches of technical education. Greater efficiency is consequently now demanded of candidates for the Board of Education examination in the principles of mining, and for the examinations for certificates as colliery managers and under-managers. In order to meet these conditions there has been of recent years a steady output of new elementary mining text-books. Many of these are excellent, but not one of them is presented in so attractive a form as the latest addition to the list by Mr. James Tonge. Well printed, tastefully bound, and copiously illustrated, it gives in concise form an accurate view of the subject of coal-mining, together with such information regarding collateral science as is essential for the elementary student.

In his treatment of the subject, the author wisely has followed closely the logical and natural order laid down by the late Sir Clement Le Neve Foster for the Board of Education syllabus. General ideas are first given regarding the occurrence of coal and the methods of search. The sinking of shafts and the working of coal then receive attention. The means of supporting the roof and sides of underground excavations, and the conveyance of the coal to the shaft and thence to the surface, come next. Other chapters are devoted to the important operations of keeping the workings free from water, and of supplying them with fresh air and light. The volume concludes with chapters on the preparation of coal for the market, and on the accidents and diseases incidental to the miner's calling, with some brief notes on the laws regulating mining in this country.

These varied subjects are dealt with in a thoroughly practical manner, and although necessarily brief, the descriptions are well up to date. We note, for example, an interesting account of the Parsons turbo-fan. A screw fan, used in conjunction with a compound steam turbine, at a colliery at Wylam-on-Tyne exhausts air from the pit and discharges it into the atmosphere through a conical outlet. The diameter of the fan is 5 feet, and it passes 120,000 cubic feet per minute at 2-inch water gauge, running at a speed

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